E/CONF.39/A/336
5 Nov.1962
ORIGINAL : ENGLISH

UNITED NATIONS CONFERENCE
ON THE APPLICATION OF SCIENCE AND TECHNOLOGY
FOR THE BENEFIT OF THE LESS DEVELOPED AREAS

Agenda Item: A

Romania

THE INVENTORYING OF THE NATURAL RESOURCES AND COORDINATED ACTION FOR THE BETTER EXPLOITATION OF VARIOUS TYPES OF RESOURCES

By Costin MURGESCU,
Deputy Director of the Institute
of Economic Research
of the Romanian People's Republic Academy

Papers have been contributed to the United Nations Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas as working papers for that Conference. They are published as presented by the contributors, and the contents and the views expressed are those of the contributors. (See notes overleaf.)

NOTES

1. Papers selected for inclusion in General Sessions will be available at the Conference in the following official languages of the United Nations: English, French, Russian and Spanish.

2. Papers selected for inclusion in Specialized Sessions will be available at the Conference in only one of the above official languages.

3. Summaries of all papers, as submitted by contributors, will be available at the Conference in the following official languages of the United Nations: English, French, Russian and Spanish.

4. Papers and summaries will not be available for general distribution in advance of the Conference. They will be published in advance in limited quantities only for the use of delegations of participating governments and of other authorized participants. Post-Conference publication and general distribution of the Conference Proceedings will follow United Nations practices as laid down by the United Nations Publications Board.

THE INVENTORYING OF THE NATURAL RESOURCES AND COORDINATED ACTION FOR THE BETTER EXPLOITATION OF VARIOUS TYPES OF RESOURCES

No.882

A.

Costin Murgescu, Deputy Director of the Institute of Economic Research of the Romanian People's Republic Academy.

The Importance of inventorying the natural resources

1. The speeding up of the industrial development is today ofor all under-developed countries, a fundamental necessity on the carrying out of which depends the diversification of their national economy, the growth of the economic potential, and as a consequence, the raising of the income per capita. It is absolutely clear for us that the desire expressed in resolution Nr.1710 (XVI) of the U.N.O. General Assembly , to see the underdeveloped countries achieve, at the end of this decade, an annual rate of increase of the total national income by at least 5 per cent would be unreal without a sustained policy of industrialization.

2. In order to ensure a full and rational utilization of the natural and man-power resources of each country, the plans or programmes of industrialization must be based on as detailed as possible knowledge of these resources. The scientific inventorying of the natural resources is an essential pre-requisite - in connection especially with the long term planning - for the efficient guiding of the main lines of development, for the determination of a corresponding structure of investments in keeping with the industrial branches and sub-branches for which the most part of the efforts must be made.

3. Accepted in theory, the implementation of this condition is sometimes under-estimated in the practice of the drawing up of the industrialization programmes. One of the reasons of this under-estimation is the opinion that the present level of information about the natural resources offers a sufficient basis for determining the political directions of industrialization. But, if no country proceeds from nil as regards the level of knowledge of its natural resources, it is not less true that very many do not know in detail these resources and possibilities. The same conditions have determined the underdevelopment, and also a low level of information of the respective resources. We shall mention in this respect the experience of Romania. In the period between the two world wars, Romania was sixth among the oil producing countries of the world; the exploitation of oil, however ,was especially carried on only in a limited zone, about which the experts asserted that it was going to be exhausted so that in 1936 it was estimated that Romania's reserves could ensure the production for only 10 to 15 years. The removal of the foreign monopolies and the taking over by the state - in 1948 - of the prospection and exploration works , have led to the discovery of new deposits either in completely new regions, or at greater depths, under the layers previously exploited. The annual crude oil production could thus be raised in 1961 by about 5 million tons as against 1938, the new producing regions and the deposits discovered after 1948 giving about 85 per cent , of the total quantity of crude oil being extracted today.

4. The importance of inventorying the natural resources for laying the basis of the plans of industrialization does not at all imply the subordination of the beginning of industrialization to the complete carrying out of industrialization. The inventorying of the natural resources arouses numerous problems. necessitates materials means, cadres and time. To postpone the urgent work of industrialization until the carrying out of this operation would practically mean to enter a vicious circle and condemn the under-developed regions to stagnation. The solving of these two problems must be achieved at the same time, they should complete each other during their evolution supporting each other. If the present level of knowledge of the natural resources is not sufficient, in most countries, for laying the basis of the industrial lization plan, it nevertheless offers the possibility of establishing the main directions of developing industrialization, the inventorying operation having to expand and render these directions in detail. In fact, inventorying itself must be conceived as a permanent action considering the possibilities constantly being created by the progress of science and technique either for drawing new resources into the economic circuit, or for new turning to account of the known resources.

The conditions of inventorying the natural resources

5. An important condition is that the action of inventorying the natural resources unfold in an efficient way and in keeping with the requirements of the speeding up of industrial development, refers to the setting up and consolidation of the permanent sovereignity of each people over the riches and natural wealth in their country. Historic experience has shown that on the extent to which this national sovereignity is ensured, depends the possibility of each country to remove the economic, political and juridical obstacles which prevent not only the rational turning to account of its natural resources, but even the action of inventorying them.

6. The inventorying of the natural resources being carried out on a national scale and in a coordinated way, the role of the state in the economic life and the means it possesses will directly determine the ampleness and efficiency of each action undertaken in this respect. In Rumania, for instance, the setting up of the state property - as property of the entire people - over all the resources of the subsoil, waters, etc. has played a decisive role in the subsequent broad unfolding of the inventorying work.

7. The inventorying of the natural resources raises complex problems on the successful solving of which depends the way in which it is organized In Rumania, the activity carried on in this direction is organically integrated in the plan for the development of the national economy, a fact which enables both the permanent correlation of the research work with the current and future requirements of industrial development and the ensurance of the material and financial means and cadres necessary for the inventorying action.

8. The directions of inventorying are of course many-sided: their number grows in relation to the variety of the resources of the respective country It is difficult, however, to suppose that a country in the initial stage of industrialization could in a rational way, undertake the inventorying action in all possible directions and with equal intensity. The hierarchization and placing at intervals of the directions of inventorying are not achieved on the basis of an abstract outline, but must be determined in a planned way in relation to the specific conditions of the country and the fundamental targets of the plan of industrialization in the respective period of time. In Rumania, for instance, one of the main problems raised during the transition to socialist industrialization lay, on the one hand, in the unsatisfactory level of the pro-

duction of electric power, and on the other, in the irrational structure of the natural resources of electric power used in this branch. This situation led to the fact that one of the main directions of the inventorying action referred to the country's electric power resources, in view of establishing the possibilities of developing the electric power output by the utilization of hydroelectric power resources of the country, with a view to establishing the possibilities of developing the production of electric power by the use of the hydroelectric power resources and inferior fuels. The results of the research work carried on and discussed in detail at the Academy of the Romanian People's Republic have been used in the drawing up of the ten-year electrification plan of the country, achieved during the years 1951-1960. The afore-mentioned example has a certain general value since under the conditions of modern technique, electrification must be a step before industrialization; the implementation of this requirement imposes the granting of priority to the inventorying of the electric power resources in the placing at intervals of the order of operations by taking into account their urgency.

9. Conceived as an integral part of the programme of industrialization, the action of inventorying the natural resources cannot be limitted to the stage of the finding out and valuation. At the same time it implies the depending of the study by laying the technical economic basis of the possibilities of the optimum utilization of the respective resources. Without this, the use of the results of inventorying in the drawing up of the programme of development of various industrial branches becomes impossible.

10. The practical implementation of the inventorying of the natural resources in the established directions is indisolubly linked to the training of the cadres of necessary experts, also to the organization of a system of research institutes and organisms with precisely determined profile, tasks and attributions. Knowing the significance of this problem, we think it absolutely useful that the institutes of economic development and planning, now being set up in certain countries that are now developing, in keeping with the recommendations of resolution 1708 (XVI) of the U.N.O. General Assembly - should grant due attention to creation of the necessary prerequisites for the drawing up of certain plans of scientific study of the natural resources.

11. No matter how well conceived, any plan of inventorying the natural resources becomes futile if, in its implementation neither the technical basis, nor the corresponding financial means are ensured. The allocation to this purpose of an important quota from the investments allotted by the state for the economy, is one of the explanations for the achievements obtained by the Romanian People's Republic in this field. Thus, between 1950 and 1961, to an increase of the crude oil output of nearly 2.4 times, the industrial reserves increased three times; there are similar situations with the other subsoil resources. The plan for the years 1960-1965 providing for the further increase of extraction, at the same time envisages the considerable growth of the industrial reserves at all the categories of subsoil resources.

12. Some foreign commentators try to explain these successes of the Romanian People's Republic exclusively through the angle of the natural resources of the country. We believe that such an explanation cannot help us understand the problem under discussion. It would be more adequate to take into account the fact that between 1954 and 1959 the investments of the Romanian state only for geological research work amounted to eight thousand million lei, that is over 16 per cent of the total volume of industrial investments. In the present Six Year Plan(1960-1965) 12 thousand million lei are allotted for geological research, that is about 12 per cent of the total of envisaged industrial investments.

13. The specific weight of the investments made for the inventorying of the

natural resources inevitably varies in keeping with the specific conditions of each country and with the concrete objectives established by it in the industrial development. What seems to us essential, is that these investments should concurrently enable : the expansion of the basis of raw materials of the country required by the development of all the industrial branches for which there are favourable natural conditions and the increase of reserves over a longer period of time in the conditions of the growth of extraction.

Organization of inventorying the natural resources in Rumania

14. Characteristic of the system of organization of the inventory action in Rumania is the close cooperation between:

- the scientific research institutes of the Rumanian People's Republic Academy called on to solve the fundamental theoretical problems of the inventorying and turning to account of the various resources;

- the research institutes under the economic ministeries and departments, where research work is continued in the field of designing and economic substantiation ;

- the ministeries and departments which turn to good account the respective resources ;

- the central organs of coordination and planning.

15. The forms underwhich this cooperation is achieved varies in accordance with the field and problem being solved. Sometimes, the cooperation is the result of a common plan target achieved by each and every institution in a longer period of time in keeping with their specific attributions ; other times, the cooperation is achieved as part of a collective or of a mixed commission with a temporary character. What seems to us essential is that the system of organization should:

- ensure the convergence of all activities unfolded in the respective domain for the practical solution of the problem imposed to the national economy by the requirements of a rational turning to account of the natural resources;

- exclude parallelism in work, which could lead to a waste of efforts and rise the cost of inventory work.

16. As the way in which this system functions in the field of inventorying and fully using the waters is presented in a separate paper, at item A 4.1.2 of the agenda of the present Conference, we shall hereby present the way in which the same system functions in the field of inventorying subsoil resources.

17. In the field of the subsoil resources, participating in the action of inventorying and valuation, is the Geological Committee under the Council of Ministers, as an all-country coordinating forum of the geological activity on the one hand, and on the other, are the ministeries responsible for the exploitation of the respective resources (The Ministry of Oil and Chemistry, the Ministry of Mines and Electric Power, etc.)

18. The operations of geological and mining prospection and exploration are carried out in specialized units belonging either to the Geological Committee, or to the above mentioned ministeries. The enterprises of the Geological Committee carry on geological research work in new zones all over the country, while the ministeries carry out work in the perimetres on the zones under exploitation, and for their extensions

19. a) The operations of inventorying the reservesof mineral substances

are based on precise geological researches made on topographical maps at the level of present-day technique which are drawn up by aerophotogrametric surveys. Through the faithful rendering of the physiographic pecularities of the soil, the maps drawn up by aerophotogrametric surveys can be successfully used also in the sorting of the land degraded by soil erosion, in the sorting of the soil falling in, etc., and can serve as basis for the study of the soil in connection with the hydro-energetic meliorations.

b) The general geological survey is followed by the geological prospections at bigger scales (the scale 1:2o,ooo - 1:1o,ooo - 1:2,ooo)which aim at recording all the appearances of useful mineral substances met in natural outcrops or by small outcrop operations (ditches, trenches).

c) The geophysical prospections by various methods (seismics, gravimetrics, magnetometrics, electrometrics, radiometrics, etc.) are recommended to be carrying out both for completing the geological prospections in regions with natural outcrops, and for studying the regions without such outcrops. One can apply in certain cases, also the geo-chemical prospection, for studying the possibilities of extension in depth of certain deposits of ores and hydro-carbides (oil and gases).

d) By applying the results of the geological and geophysical prospections, special departments carry on exploration work, through drillings for hydro-carbides and by mining operations and drillings for ores.

e) The operations of prospections and explorations lead first of all, to the discovery of C2 geological reserves, and through the making denser of explorations one can achieve the outlining of the C1 projection reserves. Chemical and optical analyses are made in laboratories of chemistry and petrography endowed with modern apparatuses ,om the tests systematically gathered during the exploration operations, in order to determine the content of the useful mineral substances discovered, and for turning them in this way into reserves of the B category.

f) Only after the carrying out of these operations, can one pass on, on the basis of the reserves homologated by a special commission, to the projection and opening of exploitation work.

g) At the same time, with a view to increasing the economic efficiency of the prospection and exploitation operations, one should take into account the fact that, in keeping with the existing possibilities, the exploration of the mineral resources could further be used for exploitation purposes. To this aim, the dimensions used in the exploitation are considered in the designing of the network of the main operations, as regards the distance between the horizon of exploitation, the distance between the vertical or slanted operations and the digging profile.

2o. The action of identifying the wood resources - led by the Ministry of Forestry Economy, under the subordination of which there are a number of institutes of forestry research, studies and designs - has the following objectives: the determinations of the growth of tree per years, species and zones; the establishing of the conditions of territorial location and in time of the cutting areas; the establishing of the best conditions for forest planning for exploitation and replanting of the exploited cutting areas, etc.

21. a) In the field of agriculture, the main inventorying action was synthetized in the study regarding the division into zones of agricultural output, the aim of which is to reach an as efficient and rational as possible utilization of the land.

b) In its first stage , carried on under the guidance of the Rumanian People's Republic Academy, the study comprised the analysis of the natural and economic conditions in our country in relation to the requirements of each production branch, and concluded with an economic study of the production zones. The researches regarding the problems connected with the natural framework of production, that is the climatic geomorphological and soil conditions, have synthetized the characteristic elements and put them down in the plans of the regions at the scale 1:500,000. The confruntation of these elements with the biological requirements of plants, has led to the drawing up, at the same scale, of ecological maps for the main plants. The study also comprises recommendations for the necessary agro-technical measures, as well as the provisional map of the dirision into districts of the species and races for the main plants and species of animals.

c) In a second stage, the study was deepend and completed at the level of each village of the country, under the leadership of a Central Commission for the division into zones of the agricultural production, with the direct participation of the local agricultural bodies . Numerous new aspects have been concretized and localized in this stage, such as for instance: the quantitative relation between the ecological classes, the size and location of the areas with compulsory use, a.s.o. ,that is the ennumeration of all the resources which enable the adoption of a documented hypothesis of the all-out development of agricultural production.Particular attention has been granted to the study of the agricultural territory of each village and the drawing up of topographical maps at the scale 1:10,000 or 1:20,000 . The location on such territories of the qualitative aspects of the production factors and the calculations made have offered the possibility that in the various stages of synthesis of the study on district ,region or the whole country one could appreciate, in a comparative way, the possibilities of development of the branches and cultures, and establish the most correct proportions.

d) The deepening of the studies regarding the differentiated localizing on territory of the economic and natural conditions has concluded by the drawing up of a hypothesis of development in the future of all the branches of agriculture. At its basis lies the research of social economic and natural conditions under the dependence of which the production process is taking place. The variability of the factors of a geomorphological, climatic and pedological order, associated with the social ,economic factors, reveal from one agricultural enterprise to another, objectively different possibilities of development of the production branches.

e) The division into zones of agricultural production by the final delimitation of ten production zones on the country's territory is used in the drawing up of the measures of economic policy to be taken in view of the increase an intensification of the agricultural output in the Rumanian People's Republic.

The coordinated action of the complex and superior turning to account of the various types of resources

22. No matter how important and varied the inventoried natural resources for the economic development of a country, essential is the industrial activity which turns to account the raw substances obtained from nature, turning the natural resources into manufactured products with an incomparably bigger utility than the objects of labour subjected to processing. This implies a coordination of the action of turning to account the natural resources so that one could ensure a high economic efficiency.

23. In the coordinated action of turning to good account the various types of natural resources, we have to consider the necessity that in all the

the industrial branches and for all the country's natural resources, the technical and economic characteristics of the raw materials must be turned to account, attaining as big values as possible per unit of raw material subjected to processing. The goal is to obtain an as full as possible satisfaction, under the given conditions and for the future, of the necessities of the national economy and the reduction of the expenses of social labour per unit of products - two aspects of the economic efficiency of the turning to account of the natural resources, which are closely connected between them.

24. In Rumania a number of studies are made for ensuring as fully as possible and with small expenses the requirements of the national economy, in choosing the way in which each natural resource is going to be turned to account, the directions and proportions in which they are going to be distributed on branches and products. Based on the system of balance-sheets of the national economy, these studies enable the establishing of : the most adequate proportions in which the various natural resources are going to be exploited and the directions of orientation for their industrial processing, the mutually correlated rate of development of the capacities of extraction and industrial processing for each natural resource; within the processing industry, the rate of development of the production capacities for various stages of industrial processing (sorting, preparation, ennobling, industrial, primary and secondary processing); the most adequate technological methods for the industrial processing of raw materials;the investments that are going to be made for developing the production capacities of industrial processing, first of all of those capacities which through the use of modern technique can make possible the turning out of certain products with a bigger use value; the possibilities resulting from the deepening of relations of international cooperation; the tasks of the scientific researches in the study of new, superior methods of industrial processing, etc.An ample, coordinated action of complex industrial turning to account of the various natural resources is thus achieved on the ensemble of the national economy.

25. a) The achievements obtained by Rumania in the turning to good account of the natural resources in the post-war period,prove the importance of the organization of such a coordinated action of superior turning to account of the soil and subsoil riches. This is also reflected in the changes which occur in the structure of the utilization of the various natural resources, and implicitely on the basis of the raw materials of the different industrial branches.

b) An example is offered in this respect also by the carriers of primary electric power. The policy pursued in this direction has observed the maximum turning to account of the electric power potential of each natural resource; the achievement of an optimum structure of the electric power balance-sheet, as regards, the kinds of power and carriers of primary electric power so that it should ensure the corresponding increase of the electric power basis and of the basis of raw materials necessary to the industry, for a longer period of tine with ever more reduced investments and exploitation expenditure. Thus with the rise of the total production of the carriers of primary electric power, the measures taken for the turning to good account of the considerable reserves of inferior coal made it possible to raise the weight of lignite and brown coal in the balance-sheet of electric power resources, while the measures taken for the rational management and the superior turning to account of wood has led to the systematic and rapid decrease of the weight of fir wood in the production of the carriers of primary electric power (from 14 per cent in 1938 to nearly 4,3 per cent in 1960). The way of using thermo-power resources has also changed during the same process, increasing more rapidly the quantities destined to the turning out of some forms of power and products especially efficient from the point of view of the entire national economy such as : electric power, coke,

semi-coke, the raw materials necessary to the chemical industry. The degree of processing has deepened in the oil processing industry, the structure of production being improved; the weight of benzenes with over 90 octanic number; aromatics have started being produced in our country for the first time (benzene, toluene, xylene, benzene ethyl), fractions for oxasynthesis, hydrofined, chimization gas, etc. In the structure of the utilization of timber, the consumption of wood of inferior use has been reduced (fire wood, charcoal, sleepers) and the consumption for more valuable products has increased (logs for play wood, fibro-wooden slabs and cellulose) also considerably increasing the wooden finite products.

26. The action for a superior turning to account of the natural resources naturally implies, the setting up of industrial units equipped with advanced technique and technology, by the corresponding development of the machine-building industry. At the same time it imposes new forms of organizing industrial production. Rumania's experience proves for instance, the great efficiency of the big works for the complex industrial processing of raw materials concentrated on the use of a single natural resource as basic raw material. In Rumania, such works comprise several production units technologically specialized or specialized on a certain product ensuring the rational, integral and efficient turning to account of the respective raw material. Thus for instance if in a timber yard the basic finite product represented 55-65 per cent of the wood, and in a ply-wood factory 4o-5o per cent of the wood, in the yards for the complex industrialization of wood the finite products amount to 92-99 per cent.

27. The coordinated action of industrial turning to account of the natural resources leads to the continuous increase in the value of the products obtained from the same quantity of raw materials - one of the most important proofs which reflect the results obtained in the use of the natural resources of a country. As a consequence of such an action, in Rumania in the process of socialist industrialization the value of the products obtained from a ton of raw material was in 1960 compared with 1955 nearly 17 per cent bigger at crude oil, 32 per cent at metal, approximately 6o per cent at methane gas, over 66 per cent at wood, which contributed to the more complete satisfaction of the requirements of home consumption and extended the possibilities of the country's participation in international economic exchanges with complex products and of an increased economic value.

28. The coordinated action of superior turning to account of all types of natural resources which a country possess -action based on the scientific inventorying of these resources - on the rational development of extraction - and naturally - of the modern processing industry, as part of which a decisive role is played by the machine-building industry - represents, to our opinion, the main direction towards which the policy of industrialization must be directed, in order to ensure in all countries which are developing, an acceleration of the economic increase, of the rise of national income and the growth of the people's living standard.

1430 E - Nov.1962 - 1,600